Human Papillomavirus (HPV) Knowledge and Vaccination Rates:

Based on Health Information National Trends Survey (HINTS) United States Data from 2005-2018

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Abstract:

Human Papillomavirus (HPV) is the most common sexually transmitted disease worldwide (CDC, 2017). A literature search was completed identifying HPV milestones and breakthroughs over the years. Several government agencies are working to achieve the goal set by Healthy People 2020 of having 80% uptake of the HPV vaccine by adolescents to prevent infection. However, uptake by the United States has been very low and slow compared to other countries. There is a need to identify and understand the United States population's knowledge surrounding HPV, the HPV vaccine and barriers to the uptake of the vaccine. The aim of this paper is to identify trends in the knowledge of the U.S. population as related to the understanding of HPV. Then compare these rates of understanding to the HPV regulation changes by the FDA and CDC and campaigns directed at increasing HPV vaccine uptake. Knowledge questions about HPV repeated from a national population-based survey, the Health Information National Trends Survey (HINTS), will be compared across three HPV-related HINTS questions between 2005 and 2018. There has been little growth in HPV knowledge in the general population in the U.S. Additional research needs to be conducted to determine the barriers present to the knowledge of HPV and uptake of the vaccine.

Introduction:

Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the world according to the Center for Disease Control and Prevention (CDC, 2017). HPV can infect both males and females equally. Nearly 79 million people are currently infected with HPV in the U.S., with approximately 14 million documented cases of new infections each year (Schneyer, 2015). To date, there are over 150 known strains of HPV, with most strains being asymptomatic (CDC, 2016). These asymptomatic cases will often resolve without additional treatment and do not cause additional health problems or concerns (CDC, 2016). However, some strains of HPV cannot be cleared by the body and the infection does cause additional health problems and concerns, with the potential to have lasting effects for the infected individual. HPV infections have been linked genital warts, respiratory papillomatosis, and cancers of the cervix, penis, vagina, vulva, anus, and oropharynx (CDC, 2016 and HPV, 2018).

A time line was generated to portray relevant milestones and breakthroughs related to HPV (Figure 1 and Figure 2). These milestones include discovery of the virus in the 1960's, the linkage of the virus to cervical cancer in 1984, creation of the HPV vaccine and FDA approval (2006), and campaigns over the last decade relating to HPV vaccinations to increase the vaccination rates.

The first HPV vaccine (Merck's Gardasil ®) in 2006 and second release of an updated HPV vaccine in 2014, provides is protection against nine HPV strains (6, 11, 16, 18, 31, 33, 45, 52, and 58) (CDC, 2016). These nine strains are responsible for 90% of the cervical cancer cases, 85-90% of anal cancer in males and females, 30% of vulvar cancer, 70-75% of vaginal cancer, and 90% of genital warts in males and females (Gardsail9, 2017). In 2016, the recommendation

from the Centers for Disease Control and Prevention (CDC) for HPV vaccination is for both males and females between the ages of nine and 26 to complete a two or three-dose vaccine series depending on age (CDC, 2016) In 2018, the CDC extended the recommendation to include males and females ages 27 to 45 for the three-doses HPV vaccine (CDC, 2018). Healthy People 2020 included increasing HPV vaccination rates as one of the objectives; the goal was for 80% of adolescents to receive all three doses of the HPV vaccine (Schneyer, 2015).

Although the FDA has released new recommendations and pharmaceutical companies have worked on educational campaigns for HPV for the last 15 years, there is still a slow and low uptake of the HPV vaccine. Presently, the U.S. falls far below the predicted mark of 80% uptake rate, with only 49% of the U.S. adolescent population, ages 13-to-15, completing the HPV vaccination series reported in 2017 (HPV, 2018). There is a median uptake of 50% (range 29-78%) for all states (HPV, 2018). Rhode Island and District of Columbia had the highest completed dosing of HPV vaccinations in 2017, with 78% coverage, and the lowest ranking states are Colorado with 31% and Mississippi with 29% coverage (HPV, 2018).

However, the U.S. is falling behind other developed nations with HPV vaccination rates. In 2007, Australia introduced a free school-based vaccine program for school-age girls, and in 2013 for school-age boys (Cancer Counsil Australia, (n.d.)). Coverage against HPV infections continues to rise in Australia; 79% of females and 73% of males completed the three-dose regime by 15 years of age in 2016 (HPV, 2018). Additionally, by 2017, the United Kingdom had completion rates of the two-dose HPV vaccine of 83 percent for females ages 13 to 14 years of age (HPV, 2018).

In the President's Cancer Panel, it was stated that parent's and caregiver's acceptance of the vaccine is a necessity to aiding the increase of the adolescent rates of HPV (HPV, 2018).

Some of the common reasons for a lack of acceptance cited by the parents and caregivers were: vaccine not needed or not recommended by other healthcare providers, lack of knowledge about vaccine or diseases caused by HPV, and concerns about side effects (HPV, 2018). It is proposed that increasing the knowledge base surrounding HPV by presenting information about HPV in a clear and accurate manner to parents and caregivers will be advantageous for increasing the uptake of the HPV vaccine (HPV, 2018). In addition, further identification of the current barriers to the HPV vaccination within the U.S. will potentially identify ways to overcome these barriers and increase the vaccination rates in adolescents at risk for HPV infections in the U.S. and in other countries.

The purpose of this paper is to provide a review of knowledge relating to HPV, the route of transmission, HPV associated cancer, and the HPV vaccine from 2005-2018, overlapping this knowledge with the changes in regulations, and campaigns to broaden the uptake of the HPV vaccine within the U.S. The goal of determining the rates of understanding of HPV infection, HPV and cervical cancer, and the HPV vaccine by the general population is made possible by using the trends seen in the National Cancer Institute's (NCI) Health Information National Trends Survey (HINTS) data starting in 2003 and repeated every few years. This data documents the change in knowledge and development of new recommendations/campaigns for more public awareness over a multi-year period since the release of the HPV vaccine (2005-2018).

HPV vaccination has the potential to achieve the goal of having a generation where HPV infections can be significantly diminished or eradicated, and where the rates of cervical and other cancers caused by HPV infection are significantly decreased. From a U.S. and global health care standpoint, increasing the HPV vaccination rates thereby preventing infections would allow for a reallocation of resources to other areas and prevent unneeded spending on a preventable disease.

Background/Review of Literature

Numerous systematic literature reviews exist with regard to basic HPV knowledge, HPV and the link to cervical cancer, the rates of vaccinations in the U.S., and the possible barriers present for preventing the necessary adoption of the HPV vaccination. In 2015, a literature review analyzed the U.S. recommendations for immunizing adolescents in compliance with the recommendations from the Advisory Committee in Immunization Practices (ACIP) of the CDC (Schneyer, 2015). At that time, the coverage for completion of the three-dose HPV vaccine series was 38% of females and only 14% of males within the U.S. (Schneyer, 2015). Since that time, rates have risen to nearly 50% of the adolescent population ages 13-to-15 having up-to-date HPV vaccinations; however, the incidence of new HPV infections remains nearly the same (HPV, 2018).

Health Information Nation Trends Survey (HINTS)

NCI created a general U.S. population survey to determine the knowledge, beliefs, and attitudes towards cancer and to track cognitive and behavioral changes over time (HINTS, 2003). Survey questions were developed by staff at the NCI and their contractor, Westat, using social science research while adding in the areas of medical informatics, human factors psychology, and social ecology (HINTS, 2003). HINTS was to be the "first survey to provide in-depth data on the specific ways in which health information consumers utilize both traditional and new media to meet cancer information needs along the cancer continuum" (HINTS, 2003).

Questions relating to HPV were first used in the HINTS cycle 2 dataset released in 2005 (HINTS, 2005). Since that year, HPV-related questions have remained a constant part of the HINTS survey, being present in surveys completed in 2007, 2013, 2014, 2017, and 2018

(HINTS, 2018). In 2018, it was noted that over 70% of the surveyed U.S. population is aware that HPV can cause cervical cancer, but this statistic had remained the same or fallen since 2006 when the first version of the HPV vaccine was released (HINTS, 2018, CDC, 2016). In addition, only 60% of those surveyed were aware of the HPV vaccine, indicating that nearly 40% of the population was unaware there is a vaccine to prevent HPV infections from the strains that cause cancer and genital warts (HINTS, 2017). This demonstrates the disconnect between the recommendations for vaccinations by the Advisory Committee on Immunization Practices (ACIP), the objectives for Healthy People 2020, and recommendations from the President's Cancer Panel (HPV, 2018)

Evidence suggests that there is an overall lack of knowledge by the general public as to the severity of HPV infections and the importance of receiving the HPV vaccination. The barriers that exist for HPV vaccination include, but are not limited to, lack of knowledge by the patient; lack of knowledge by the provider; lack of provider recommendation; and, chiefly, parental beliefs that their child was too young to be sexually active (Schneyer, 2015).

Using HINTS data from the 2005, 2007, 2013, 2014, 2017, and 2018 surveys, three questions were selected to observe the HPV-related trends over time: (1) "Do you think you can get HPV via sexual contact?" (2) "Do you think HPV can cause cervical cancer?" and (3) "A vaccine to prevent HPV infection is available and is called the cervical cancer vaccine or HPV shot. Before today have you ever heard of the cervical cancer vaccine or shot?" (HINTS, 2005, 2007, 2013, 2014, 2017, 2018).

Methods

Participants

Every two to three years the NCI creates and conducts a survey to collect data that represents U.S. population-based knowledge, attitudes, and behaviors towards cancer and health-related topics within the U.S. (HINTS, 2014). The HINTS target participants are 18 years or older in the non-institutionalized population of the U.S. (HINTS, 2014). The subjects are randomly selected from the U.S. general population using the random digit dialog (RDD) method. The RDD uses numbers from all telephone exchanges in the U.S. (HINTS, 2005). In 2003 and 2005 during the phone survey, one adult is selected to speak with and answer selected questions on health-related topics. In the case of three or more adults in the household, the adult with the most recent birthdate is selected for the survey. In 2007 and subsequent years, after the initial phone screen there was an agreement between the participant and the surveyor for a survey to be mailed, completed, and mailed back to the data collection center or completed online (HINTS, 2011). In 2007, the use of a Spanish interpreter with a toll-free number was added to accommodate Spanish-only speaking participants, allowing for a more diverse population to take part in the survey (HINTS, 2007). Starting in 2011, the survey was sent in both English and Spanish with a toll-free number available to both populations (HINTS, 2011). This change in 2011 allowed for a larger pool of participants to be included in the surveys. Each year the number of participants assessed varied as did the number of completed surveys (See Table 1). In addition, not every participant was asked all of the same questions in each of the survey years (HINTS, 2005, 2007, 2011, 2012, 2013, 2014, 2017, 2018; accessed in 2018). The sampling plan was created to minimize non-response by limiting the number of questions asked per subject. The sample design and HINTS instrument development descriptions are published in detail on the NCI HINTS website (https://hints.cancer.gov)

Measures

The HINTS dataset includes cancer-related topics with some questions related to HPV. For topics of particular interest to NCI, the same question was asked for several years in a row to determine the trends above baseline. The HPV questions have been included each year of HINTS allowing for a baseline starting in 2005 or 2007 and in subsequent years to notice trends in the basic knowledge of HPV and HPV-related topics. The criteria used for the selection of questions selection was HPV-related questions with the most years of data to analyze. The included selected questions are: "Do you think you can get HPV via sexual contact?," "Do you think HPV can cause cervical cancer?," and "A vaccine to prevent HPV infection is available and is called the cervical cancer vaccine or HPV shot. Before today have you ever heard of the cervical cancer vaccine or shot?" These questions have been used in the last five or six iterations of HINTS over the last 14 years (HINTS, 2005, 2007, 2011, 2012, 2013, 2014, 2017, 2018; accessed in 2018).

Procedure

Beginning in 2003 with the first HINTS dataset, the goal was to create questions that would allow for a baseline establishment of knowledge, attitudes and behaviors surrounding cancer (HINTS, 2003). In subsequent years, one goal was to build on this foundation, with added interest in smaller focus areas, including health communication, screening, social support, mental model of cancer, and others (Cantor, Corvell, Davis, Park, & Rizzo, 2005). At least 50% of the original questions from the 2003 HINTS set were retained and used again in the 2005 set (Cantor, Corvell, Davis, Park, & Rizzo, 2005). The newly added 50% of the questions were developed and refined by a panel of experts from various government agencies and universities (Cantor, Corvell, Davis, Park, & Rizzo, 2005). The items were then ranked using all the information surrounding the HINTS questions including prior year analysis, "systemic observations, literature reviews, expert panel reviews, examination of the existing questionnaires

cognitive testing results, and timing data" (Cantor, Corvell, Davis, Park, & Rizzo, 2005). This method of repeating questions from some topic areas, while creating new questions for emerging topic areas, has continued each time the HINTS has been completed. A more detailed description of the instrument development can be found on the NCI HINTS website (https://hints.cancer.gov).

There were three levels of consideration during the creation of any HINTS question used for the survey. The first involved the scientific validity of the questions surrounding the following: "(1) the questions were well-established for assessing cancer related information, (2) the questions could be self-reported accurately by the adult population, and (3) the sample size was adequate to produce reliable estimates in analyses" (HINTS, 2003). A second level of consideration of HINTS was "(1) the ability to monitor Healthy People 2010 goals and trends in prevalence estimates over time, and (2) the needs of the people within NCI or other agencies who had specific plans for analyzing and disseminating information based on the data" (HINTS, 2003). The final consideration involved the implementation of the survey in that "(1) an item was able to be administered over the telephone, (2) there was an equitable distribution of questions among topics, and (3) respondent burden was reduced as much as possible" (HINTS, 2003).

Results:

The year of the HINTS data collection, number of participants who were surveyed for each question, how the survey was completed, and total number of participants in a given year are recorded below (see Table 1). The first HINTS question compared to the milestones and breakthroughs timeline is "Do you think you can get HPV via sexual contact?" This was an original question from the HINTS2 cycle in 2005 (HINTS, 2017). As shown in Graph 1, the

general knowledge of the U.S. population has remained below 70%. First used as part of the HINTS dataset in 2005, the percentage of the participants who knew that HPV could be contracted via sexual contact was 63.7 %. Since 2005, there have been scientific breakthroughs including the discovery of the HPV vaccine, the update of the vaccine to the V9 Gardasil, numerous advertising campaigns focused on increasing the uptake rates of the HPV vaccine, and recommendations by the FDA, CDC, and other organizations. These milestones and breakthroughs did little to increase the knowledge surrounding HPV. As the survey was completed in subsequent years the rates rose and fell to 67.3% in 2007, 54.3% in 2013, 69.4% in 2014, and most recently in 2017 67.1%. This cross-sectional study indicates little to no change in the knowledge that HPV can be obtained via sexual contact. This is despite the advertising campaigns and recommendation changes to increase the knowledge of HPV in the general population of the U.S.

The second HINTS question chosen to compare to the scientific milestones and breakthrough is “Do you know HPV can cause cervical cancer?”. This question was an original question to the HINTS 2 cycle in 2005 (Cantor, Corvell, Davis, Park, & Rizzo, 2005). Graph 2 indicates that there was a significant increase in the knowledge of HPV causing cervical cancer from 2005 to 2008 (47.0% to 78.3%) reversed and then slowly gained back over the next several HINTS cycles. In 2006, Gardasil was approved by the FDA and recommended for adolescent girls (CDC, 2017). This spike may be attributed to the educational campaign surrounding the release of the vaccine. Between 2007 and 2013, there was a decline from the high 78.3% down to 61.2%. The rates then began to rise again in 2014, and again in 2017 from 77.0% to 79.6%. However, in the most recently released HINTS data, the percentage dropped again to 74.3%. Notwithstanding the noted variations, this cross-sectional multi-year study shows an overall

upward trend surrounding the knowledge that HPV has been linked as a cause to cervical cancer. The upward trend has leveled off over the past few survey cycles, remaining below 80 percent, despite the campaigns for increasing the understanding of HPV and the link to cervical cancer.

The final HINTS question selected, analyzed, and compared to the timeline is "A vaccine to prevent HPV infection is available and is called the cervical cancer vaccine or HPV shot. Before today have you ever heard of the cervical cancer vaccine or shot?". This question was taken from the NCI National Survey of Primary Care Physicians' Recommendations and Practice for Breast, Cervical, Colorectal, and Lung Cancer Screening (HINTS, 2017). As seen in Graph 3, the percentages have remained steady or decreased since this question was first asked in 2007, with a slight increase from 64.8% in 2008 to 66.6% in 2013. There was then a drop in 2014 to 62.6% and another drop in 2017 to 60.3%. This slow downward trend continued into the 2018 HINTS cycle with the percentage decreasing to 59.4%. This cross-sectional study indicates little to no change in the trends of knowledge around the HPV cervical cancer shot. This is despite advancements in the number of strains the vaccine prevents against and new recommendations from the FDA, CDC, and ACIP.

Discussion

Summary

The primary purpose of this paper was to identify trends in the knowledge held by the general population of the U.S. regarding HPV. With HPV infections being the most common STI globally, it is necessary to evaluate the knowledge base surrounding HPV to identify gaps and overcome barriers to decrease the rates of HPV worldwide (CDC, 2017). HINTS datasets from 2005 to 2018 and literature identifying scientific breakthroughs and milestones surrounding HPV were reviewed to observe trends and changes. Over the last decade, the CDC, FDA, ACIP, and

other organizations issued recommendations surrounding HPV infections and vaccinations. These updates extended the age limits and gender recommendations from only adolescent females in 2006 to adolescent males in 2009 and then males and females ages 11 to 45 years of age in 2018 (CDC, 2018). These changes in recommendations are aimed at increasing the vaccine uptake rates within the U.S. Healthy People 2020 set a goal of having 80% of the eligible population have completed the vaccination series for HPV (HPV, 2018). This goal has not been met by any individual state or the U.S., despite multiple campaign efforts (HPV, 2018). The "One Less" campaign, started in 2006 by Merck, aimed at educating young women as to the purpose of the HPV vaccine. In a study, it was noted that they may have learned about the vaccine from the One Less campaign, but the primary source of influence for accepting or rejecting the vaccination dosing remained with medical professionals and their own mothers' advice (Graham, 2011). As the recommendations have expanded the population scope for the HPV vaccination, Merck has created a new campaign "Versed." This campaign addresses the changes in recommendation by including a culturally diverse group of males and females (Get Versed, 2018). In addition, the Versed campaign highlights that HPV infections are transmitted through sexual contact, which was a point not included in the One Less campaign (Get Versed, 2018).

Strength of the Current Study

The HINTS datasets were created to build on each previous survey by keeping some of the same questions and following the trends from year to year in topics that involved cancer related topics (HINTS, 2018). This data is public and can be used by government agencies, healthcare providers, researchers and industry to determine areas where improvements can be made to improve the health of the U.S. public. Care is taken to ensure the participant groups

reflected the U.S. population including different socio-economic classes, races, genders, levels of education, living location, and ethnicities (HINTS, 2018). The data is then statistically weighted to reflect the U.S. population (details of this process can be found at the NCI HINTS website (https://hints.cancer.gov)

Limitations

The HINTS participants are selected using RDD, which allows for a random set of the population of the U.S. to be sampled; however, as more people move to cell phones only, this may not be a representative sample. All data is self-reported and reliant on the participant accurately understanding and answering each question. With the constant changing of recommendations surrounding HPV vaccinations, knowledge may vary across different groups based on the age recommendation limits at the time. For example, starting in 2006, the recommendation for vaccination was only adolescent girls, if the individual being surveyed is not the parent of an adolescent female or under the age of 26, there would be a decreased likelihood that the subject had been informed about the HPV vaccine. In subsequent years, the recommendations were broadened to adolescent males and most recently, in 2018, to include males and females in the age range from 27 to 45 years of age. As the recommendations from the FDA evolve to include a larger part of the population, the knowledge should also increase within the population, yet this was not the case according to the most recent HINTS data released in 2018. Therefore, there may be an underestimation of the knowledge in more relevant age groups (adults 45 and under).

Implications in Health Policy

In November 2018, The President's Cancer Panel's released recommendations to increase HPV vaccination rates in four ways with the first being the reduction of missed clinical opportunities for HPV vaccine administration (HPV vaccination, 2018). This reflects the focus that the provider- and system-level changes hold the greatest potential for aiding in the elimination of the missed clinical opportunities for HPV vaccinations (HPV vaccination, 2018). Success has been seen in other countries for reaching HPV vaccination goals by the marketing of the vaccine more directly as a cancer prevention for HPV-related cancers rather than as a prevention for HPV infections as a STI. The United Kingdom (U.K.) and Australia also implemented policy for adolescents to receive the vaccine free of charge while at school; this has played a critical role in helping countries achieve a nearly 80 percent vaccination rate (Cancer Counsil Australia, (n.d.), National Health Services UK, 2017). This action reduced the risk of missed clinical opportunities by creating a space for access for the adolescent population to obtain their vaccinations.

Directions for Future Reference

The President's Cancer Panel released the " HPV Vaccination for Cancer Prevention: Progress, Opportunities, and a Renewed Call to Action" in 2018 indicating a new push towards increasing the uptake rate of the HPV vaccine within the U.S. population (HPV vaccination, 2018). This publication identifies approaches to increase the vaccination rates by limiting missed clinical opportunities, increasing parents' acceptance of HPV vaccination, maximize access to HPV vaccination services, and promote global HPV vaccine uptake (HPV, 2018). Further research is needed to identify barriers to HPV education and vaccination on a more local-, national-, and global-level.

Positive headway is being made to increase the uptake of the HPV vaccine by the recommended populations in both Australia and U.K.. The campaigns in Australia send the message that the HPV vaccine "provides protection against HPV-related cancers in the future" (Cancer Counsil Australia, (n.d.)). The free National HPV Vaccination Program was introduced by the Australian government for adolescent school-aged females began in 2007, and began including males in 2013 (Cancer Counsil Australia, (n.d.)). This program allows for school-age students to receive HPV vaccinations at school to ensure the dose series is completed and is given at no cost to the student or family (Cancer Counsil Australia, (n.d.)). This school-based program has resulted in a reduction of young women with high-grade abnormalities in the cells of the cervix (Cancer Counsil Australia, (n.d.)).

In the U.K., the vaccine program began in 2008 with the HPV vaccine being offered free of charge to adolescent females entering year 8 in school (National Health Services UK, 2017). With recent recommendations from the Joint Commission of Vaccination and Immunizations (JCVI), the government in the U.K. will now include adolescent males in the free vaccine program (National Health Services UK, 2017). The number of genital wart infections has decreased in both male and female adolescents due to this vaccine program (National Health Services UK, 2017). There is an additional program in the U.K. for men who have sex with men allowing this population to also receive the HPV vaccine free of charge for ages up to 45 (National Health Services UK, 2017).

In both U.K. and Australia, having the free HPV vaccine programs accessed at school, with proper education for parents and caregivers, has allowed these countries to increase their HPV vaccine rates within the population (Cancer Counsil Australia, (n.d.), National Health

Services UK, 2017). The increase in the HPV vaccination rates created a decrease HPV infections, genital warts, and cervical cancer diagnosis.

Following in the footsteps of the U.K. and Australia, the U.S. could attempt to market the HPV vaccine in a different manner. This could include a more direct approach linking HPV infections to later diagnosis of cancers in both males and females. Changing marketing strategies, in combination with addressing cost of the vaccine and availability through the use of schools and insitiutions make allow the U.S. to follow in the footsteps of the U.K. and Australia in achieving higher vaccination rates in the adolescent population.

Conclusion

The cross-sectional data for HPV-related questions remained nearly the same since the questions were included in the first survey in 2005. HPV vaccination campaigns used different ways of presenting the information about HPV and the reasons to get vaccinated. Recommendations also changed surrounding who should be vaccinated since the release of the vaccine in 2006 (CDC, 2018). Numerous government panels and committees emerged to aid in increasing the awareness of HPV-related topics, with the goal to increase the vaccination rates to the Healthy People 2020 recommendation of 80% of adolescents (CDC, 2018). Despite these actions, knowledge surrounding the three HPV-related questions remains at 60-75% (HINTS, 2018). Additional action is paramount to increase this knowledge and for higher uptake rates of the HPV vaccine in the U.S.

Figure 1a: History of HPV Timeline:

1900-present time indicating significant breakthroughs and milestones

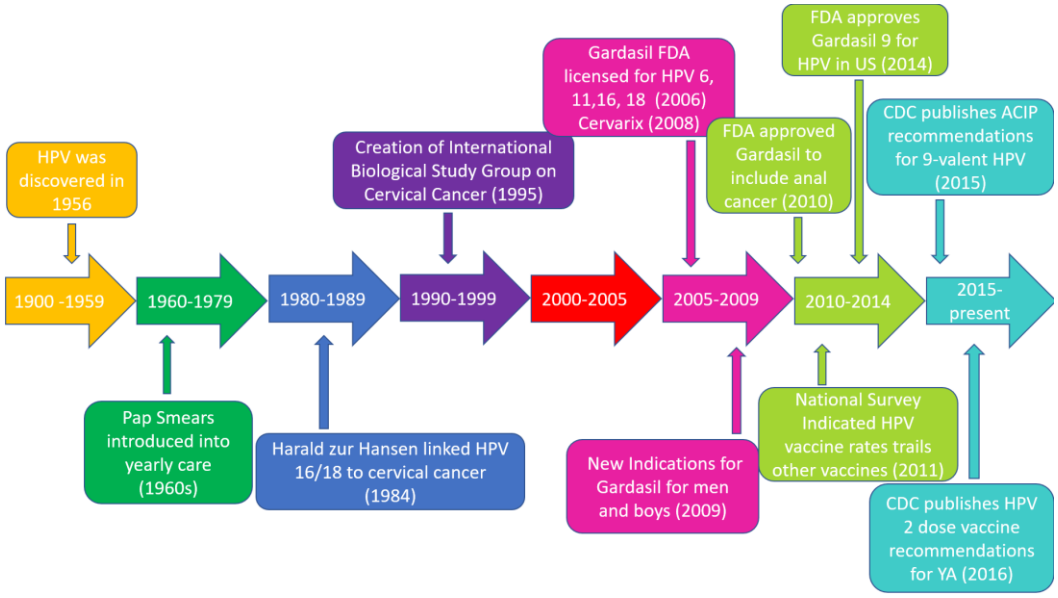
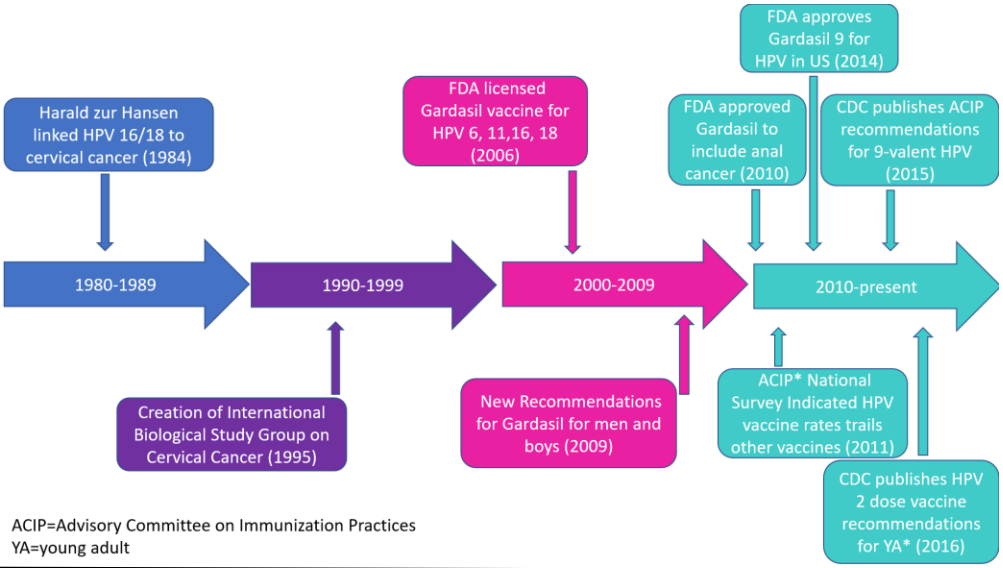


Figure 1b: History of HPV Timeline:

1980-present time indicating significant breakthroughs and milestones



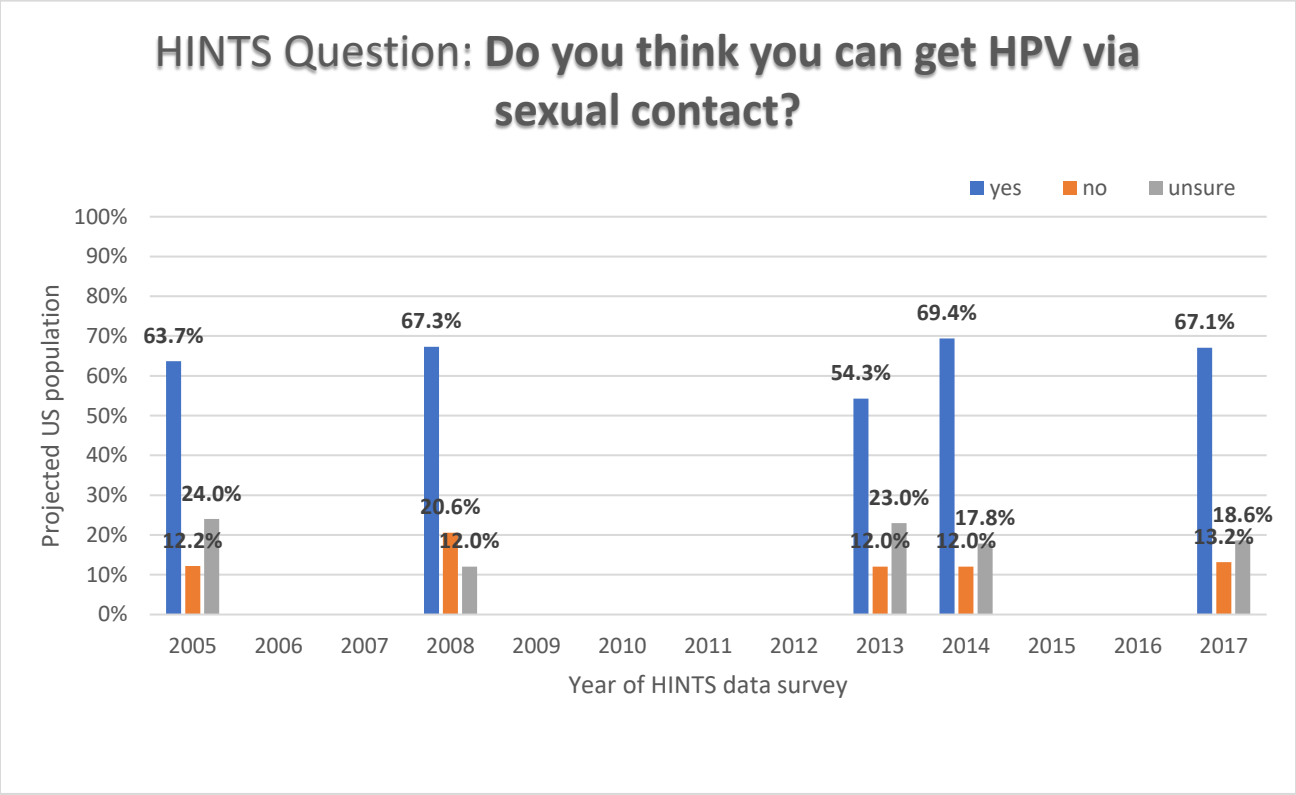
ACIP=Advisory Committee on Immunization Practices
YA=young adult

Table 1: HINTS Data and Survey Information Table

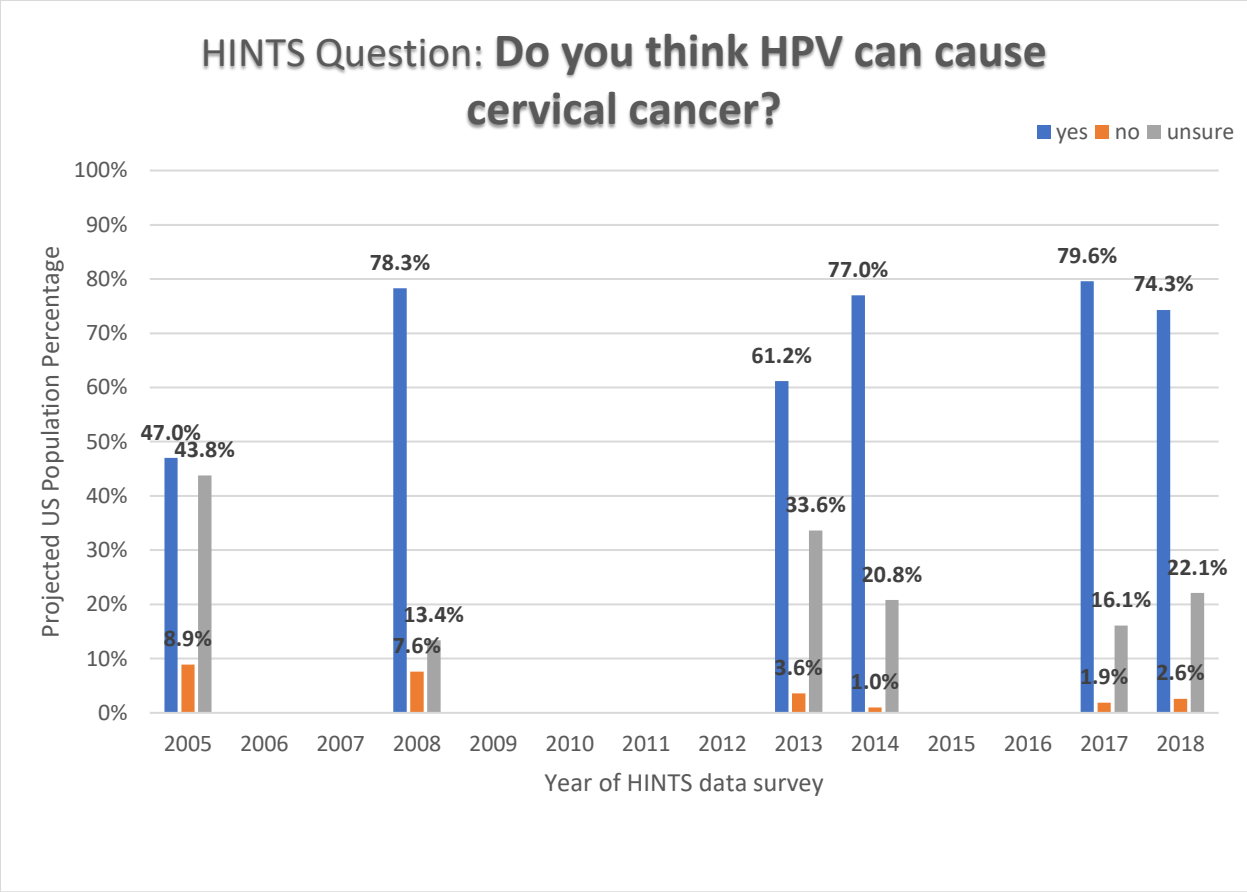
HINTS questions: Year	Do you think you can get HPV via sexual contact?	Do you think HPV can cause cervical cancer?	A vaccine to prevent HPV infection is available and is called the cervical cancer vaccine or HPV shot. Before today have you ever heard of the cervical cancer vaccine or shot?	Survey method type	Total Sample size
2005	N=1335 24%	N=1335 24%		phone	5586
2007	N=4744 60%	N=4737 60%	N=7358 94%	phone/mail	7851
2013	N=2006 63%	N=2008 63%	N=3165 99%	mail	3185
2014	N=2236 60%	N=2238 60%	N=3677 99%	mail	3730
2017	N=2031 61%	N=2034 61%	N=3285 99%	mail	3335
2018		N=2042 58%	N=3504 99%	mail	3527

Number responded/total number surveyed shown in a %

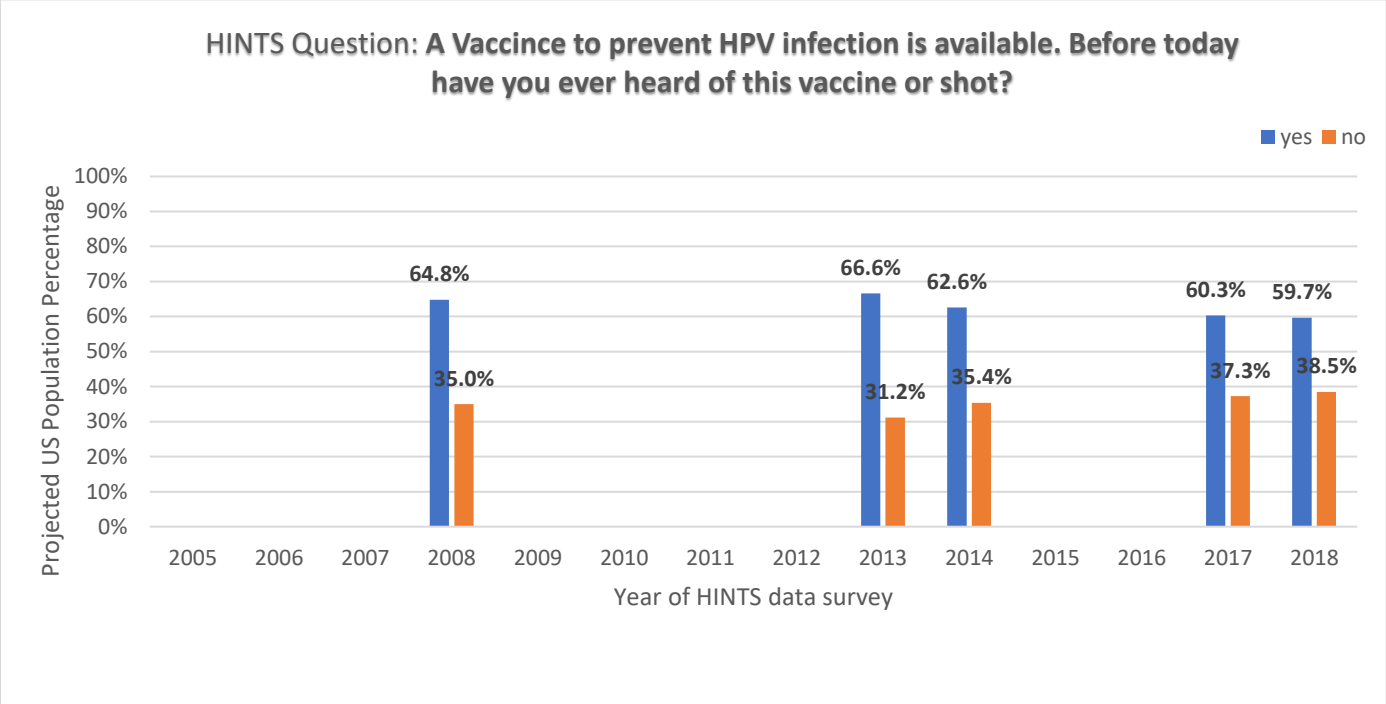
Graph 1: HINTS Question 1: "Do you think you can get HPV via sexual contact?"



Graph 2: HINTS Question: "Do you think HPV can cause cervical cancer?"



Graph 3: HINTS Question: "A vaccine to prevent HPV infection is available and is called the cervical cancer vaccine or HPV shot. Before today have you ever heard of the cervical cancer vaccine or shot?"



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